

# Monitoring Study Group Meeting Minutes

December 12, 2012  
Granzella's Inn  
Williams, California

The following people attended the MSG meeting: George Gentry (BOF—MSG chair), Clay Brandow, (CAL FIRE), Stacy Stanish (DFG), Bill Short (CGS), Richard Gienger (public), Nick Kunz (SWRCB), Sarah Martin (UC Merced), Stormer Feiler (NCRWQCB), Tim Feller (SPI), Ed Struffenegger (CFA), Doug Ferrier (consulting RPF), Karen Larsen (SWRCB), Joe Croteau (DFG), Henry Alden (GRI), Kevin Faucher (CTM), Peter Ribar (CTM), Mike Laing (NCCFFF), Kim Ingram (UCCE), and Pete Cafferata (CAL FIRE).

Participants on the GoToMeeting webinar/conference call included: Dr. Cajun James (SPI), Linda Pankonin (Sierra Club), Dr. Richard Harris (public), Nick Simpson (HRC), and Justin Augustine (CBD).

**[Action items are shown in bold print].**

The meeting began with general monitoring-related announcements:

- Richard Harris announced that is planning to develop a webinar series on riparian zone functions and management, similar to the rural road webinar series produced earlier this year (see: [http://ucanr.org/sites/forestry/Webinars/Rural\\_Roads\\_Webinar\\_Series/](http://ucanr.org/sites/forestry/Webinars/Rural_Roads_Webinar_Series/)). The preliminary plan is to have three sessions titled: (1) riparian ecology and functions, (2) active riparian management I, and (3) active riparian management II. Each session would include two webinars, each being two hours. Richard asked the MSG for agency promotional support for the webinar series; contact Richard at [rharris2464@sbcglobal.net](mailto:rharris2464@sbcglobal.net) or (707) 685-5508.
- Cajun James announced that her 10 swale sediment fence study sites on the Ponderosa Fire in Shasta and Tehama Counties experienced significant rainfall amounts (>6 inches) on December 1<sup>st</sup> and 2<sup>nd</sup>. Control fence sites without logging and ripping were completely filled with sediment, while those logged and ripped had considerably less sediment delivered.
- Pete Cafferata announced that there will be a flood frequency analysis workshop held on January 14, 2013, 8:00 – 6:00 p.m., at California State University, Sacramento (no cost to attend). It is sponsored by FEMA, USGS, and FMA. Seating is limited and advance registration is required. Deadline for registration is January 7<sup>th</sup>. Register by email at: [workshops@floodplain.org](mailto:workshops@floodplain.org). See: [http://floodplain.org/files/USGS\\_Flood\\_Frequency\\_2013.pdf](http://floodplain.org/files/USGS_Flood_Frequency_2013.pdf).
- Richard Gienger announced that the 31<sup>st</sup> Annual Salmonid Restoration Conference, "Innovative Approaches to Fisheries Restoration," will be held from March 13<sup>th</sup>-16<sup>th</sup>, 2013, in Fortuna. For more information, see: <http://www.calsalmon.org/>.
- The CLFA spring workshop titled "Forest Research in California" will be held on March 8<sup>th</sup> at the Lion's Gate Hotel, McClellan (Sacramento). See: <http://www.clfa.org/>.
- The winter NorCal SAF meeting titled "Market-Based Opportunities to Sustain Working Forests in a Changing World" will be held on January 26<sup>th</sup> at the Wildland Fire Training and Conference Center, McClellan (Sacramento). See: <http://norcalsaf.org/>.
- A fish passage design and engineering workshop will held on February 6-8, 2013 in Ukiah. Mark Lancaster, 5C, is the workshop coordinator. More information and workshop details, including a registration form, are posted on the 5C website; see: [www.5counties.org](http://www.5counties.org).

## **Developing Biological Objectives for California Perennial Wadeable Streams**

Ms. Karen Larsen, SWRCB Deputy Director, Office of Information Management and Analysis (OIMA), provided a PowerPoint (PPT) presentation titled "Biological Objectives for California Streams." Ms. Larsen's PowerPoint is posted on the Monitoring Study Group's Archives website at:

[http://www.bof.fire.ca.gov/board\\_committees/monitoring\\_study\\_group/msg\\_archived\\_documents/](http://www.bof.fire.ca.gov/board_committees/monitoring_study_group/msg_archived_documents/).

She began her talk by providing a brief overview of the technical elements of biological objectives. Bioassessment was defined as a direct measurement of waterbody health from the communities of organisms that live in those waterbodies. The SWRCB's Surface Water Ambient Monitoring Program (SWAMP) uses many different biological monitoring tools for bioassessment. Core principles include the fact that most waterbodies contain diverse groups of organisms that have predictable responses to multiple stressors, and that biological measures incorporate responses to both chemical and non-chemical stresses. Benthic macroinvertebrates (BMIs) are good indicators because they are diverse and abundant, species vary in sensitivity to stressors, and taxa reside at a site for several months to more than one year. Additionally, robust sampling methods for BMIs in perennial wadeable streams are well established.

Biological objectives rely on scoring tools that depend on reference sites. Establishing acceptable reference sites is challenging in California due to a high level of natural variability (e.g., geology, temperature, and precipitation) and areas with dense urbanization and agricultural development. SWAMP's Reference Condition Management Program started with 1700 potential reference sites across the state and applied screening criteria for watershed stressors (infrastructure, population, hydromodification, landuse, fire history, dams, mines, invasive species, 303(d) listing, NPDES discharges, etc.). Using all the screens, only 109 sites passed and they were all small streams concentrated in high elevation areas. When the screening criteria were relaxed with set "stressor thresholds" (e.g., road density, watershed development, % urban, % agriculture, etc.) to produce a better representation of all stream types, a reference site pool of 615 sites was produced. Most California regions are well represented by this selection, with the exception of the Central Valley floor (1 site), and the South Coast Xeric region (22 sites). Approximately 90% of the "reference" sites have only been sampled one time, creating uncertainty due to annual variation in precipitation, streamflow, etc.

The tools used for scoring biological condition are the Index of Biotic Integrity (IBI, multi-metric indices such as % EPT taxa) and Observed/Expected indices (O/E, where the number of observed taxa at test sites are compared to the number of expected taxa, based on those found at least disturbed "reference" sites and modeling). For O/E indices, test sites are compared to similar reference sites, based on climate, geology, elevation, etc. O/E indices have been the focus of statewide biological objectives. As an example of how impairment could be defined, Ms. Larsen showed a bell shaped distribution curve with a reference mean of 1.0 and an impairment threshold indicated at two standard deviations (SD) from the mean. She stressed that this is a work in progress and that the SWRCB is actively working with stakeholders to develop a fair and equitable system that is protective of beneficial uses.

Biological objectives were next examined in terms of regulatory policies. There are four main components to SWRCB water quality standards: (1) beneficial uses (e.g., aquatic life), (2) water quality objectives (e.g., biological objectives), (3) anti-degradation, and (4) implementation (e.g., 305(b), 303(d), permitting). The question is 'how can the SWAMP tools be used in regulatory programs?' Statutory policy authority comes from federal Clean Water Act Sec. 101. (a), which states "The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Ms. Larsen stated that our primary focus to date has been on chemical parameters, but all three must be adequately protected for aquatic life. Biological objectives provide direct evidence regarding whether the waterbody does support aquatic life; chemical parameters (pH, nutrient, toxicity) provide indirect evidence for whether the waterbody can support aquatic life uses.

A biological objectives policy is being proposed because approximately 50% of the stream miles in California are currently degraded (i.e., biologically impacted). Forest land cover have been found to have mostly good biotic conditions (~70% of streams draining forested landscapes had good biological condition), while degraded sites were concentrated in urban (San Francisco Bay Area, southern coastal California) and agricultural areas (Imperial Valley, Central Valley, Klamath River) (see: *Ecological Condition Assessments of California's Perennial Wadeable Streams*; Ode et al. 2011 at: [http://www.swrcb.ca.gov/water\\_issues/programs/swamp/docs/reports/psa\\_smmry\\_rpt.pdf](http://www.swrcb.ca.gov/water_issues/programs/swamp/docs/reports/psa_smmry_rpt.pdf)).

Biological objectives policies are also being proposed because: (1) mechanisms for protecting streams are limited in many regions of the state, (2) mechanisms for restoring streams are limited, (3) biological monitoring data are not assessed consistently statewide (e.g., IBI scores cannot be compared from one region to another region), and (4) Regional Water Boards need measureable, enforceable biological thresholds (i.e., a statewide policy makes more sense than having each Regional Board develop their own policy).

Policy goals for biological objectives include: (1) develop new or apply existing narrative water quality objectives to protect life uses, (2) establish policy for identifying and protecting high quality streams (anti-degradation), (3) define how compliance with narrative objectives will be measured—numeric thresholds, (4) establish realistic expectations by stream type, and (5) institute policy with statewide consistency and regional flexibility. Ms. Larsen stressed that the SWRCB recognizes that attempting to reestablish reference conditions is an unrealistic goal in most of the state. To develop realistic and workable policies, the SWRCB has developed and is using an extensive system of collaboration and public participation. Three groups are providing input to a Biological Objectives Steering Committee: the Stakeholder Advisory Group (STAG), the Regulatory Advisory Group (RAG), and the Scientific Advisory Group (SAG). Meetings for these groups are noticed and open to the public.

There are three main alternatives for policies related to biological objectives: (1) no action (no new policy would be established), (2) establish thresholds to protect high-quality streams, and (3) establish thresholds to protect and restore streams (e.g., using O/E score distributions and defining an impairment threshold at two standard deviations (SD) away from the mean). In the third scenario, a causal assessment would be required; the Regional Board could then impose requirements depending on the cause of the degradation. Ms. Larsen emphasized that nothing has been decided at this point in time, and that the SWRCB staff is actively gathering input from stakeholders (as occurred at this MSG meeting). Pilot studies are underway, including causal assessment in the Garcia River watershed related to timber harvest. Additional pilot studies are evaluating the alternatives with real data (Ventura watershed, southern California).

Eight biological objectives implementation issues have been identified during meetings with stakeholders: monitoring requirements, thresholds, independent applicability, exceptions for modified streams, causal assessments, impairment listing, habitat restoration, and flow. SWRCB staff are working on these topics, with a goal of making recommendations to the SWRCB in 2013. **The schedule includes a Board workshop on technical work in January 2013, with a draft policy out by July 2013.**

Ms. Larsen was asked numerous questions by MSG participants throughout the meeting, including: (1) are similar sampling protocols appropriate for both pools and riffles?, (2) natural systems have a wide range of conditions (e.g., Canoe Creek landslides)—how do reference standards take this into account?, (3) insufficient reference sites exist on the North Coast to compare to a specific potential logging site—how can this be addressed?, (4) why is it appropriate to hold good systems to a very high standard?, (5) the literature supports lower, not higher, canopy standards for increased light and primary productivity, (6) more restrictive forest practice rules from the 1970's to the present and improving conditions are not reflected in potential biological objective policies, (7) canopy measurements in the center of the channel are not the best measurement technique to represent riparian stand canopy conditions, (8) concern about the anti-degradation policy and implications for forestry operations, (9) concern about a possible requirement for causal assessments being required for every proposed THP and the extreme expense for these assessments, and (10) research-level

questions are being investigated, not project level questions. Ms. Larsen stated that a coordinated regional monitoring effort, spreading costs among private entities and public agencies, appears to be appropriate for biological objectives (not requiring each individual project to undergo a causal assessment). **She also stated that she would forward the technical questions to DFG's Jim Harrington and Dr. Pete Ode.**

### **Sierra Nevada Adaptive Management Project (SNAMP) Water Team Methods and Results**

Ms. Sarah Martin, UC Merced Ph.D. candidate, provided a PowerPoint presentation titled "Sierra Nevada Adaptive Management Project: Design, Methods and Current Research." Ms. Martin's PowerPoint is posted on the Monitoring Study Group's Archives website at:

[http://www.bof.fire.ca.gov/board\\_committees/monitoring\\_study\\_group/msg\\_archived\\_documents/](http://www.bof.fire.ca.gov/board_committees/monitoring_study_group/msg_archived_documents/).

She began with background information on SNAMP, stating that there is a general consensus that Sierra Nevada forests are at risk from high intensity wildfire, with uncertainty on how to best reduce this risk. Controversy over USFS management practices led to a lawsuit stating that the agency was not practicing adaptive management. SNAMP was initiated in 2007 as an independent third party study by the University of California to document how forest vegetation treatments designed to reduce catastrophic wildfire spread affect fire risk, wildlife, water quantity and quality, and forest health. Treatments known as SPLATs (spatially placed area fuel treatments) are used to change potential fire behavior on a landscape level or "fireshed." SNAMP was formed to test adaptive management processes through testing the efficacy of SPLATs on four response variables: fire/forest health, wildlife, water, and public participation. Teams were formed to study these variables; additionally a spatial team was established. Sites on both the Tahoe ("Last Chance") and Sierra ("Sugar Pine") National Forests are being studied. MOU partners include the Natural Resources Agency (DWR, DFG, and CAL FIRE), USFS, and USFWS. Pre-treatment data collection began in 2007. Treatments are being implemented between 2011 and 2013, with final reports due by the end of 2014. Details on the project are available on the SNAMP website at: <http://snamp.cnr.berkeley.edu/>.

The Water Team, composed of Dr. Roger Bales, Dr. Martha Conklin, Phil Saka, Ram Ray, Patrick Womble, and Sarah, have established a BACI sampling design. Both the Last Chance and Sugar Pine study sites have a control and treatment watershed (sizes range from ~400-600 ac). Study watersheds have perennial streams, mixed conifer forest, and elevations near the rain-snow transition. Four meteorological stations have been established (two at each site) at open areas on ridge tops. Hillslope instrumentation consists of snow depth and soil moisture instrumentation nodes. Stream instrumentation includes YSI Sondes for turbidity, temperature, conductivity, etc.; pumping samplers for water samples; pressure transducers for flow; and scour pans for bedload sediment. Manual discharge measurements and grab water samples are also collected.

Three main research questions are being investigated: (1) where and when is water stored, and how is it routed through the catchments; (2) what effects do forest treatments have on water quality, quantity, storage, and routing through the catchments; and (3) what is the transferability of 1 km<sup>2</sup> watersheds to fireshed response? The expectation is that the fuel treatments will reduce the leaf area index (LAI), increase snow accumulation on the ground (due to lowered interception), decrease evapotranspiration (ET), and decrease snow retention in late spring. The size and spacing of the gaps created will control snow accumulation and melt timing. Increases in snow accumulation should produce increased peak flows; changes in ET could affect the timing and magnitude of late season base flows. Changes in water quality are expected to be minimal, with changes in water chemistry a function of changes in discharge. Increased turbidity is expected to be a function of stream discharge, as opposed to hillslope erosion (i.e., little delivered sediment to the channel is expected).

Results to date show a more pronounced seasonal trend in conductivity for the northern sites (Last Chance); highest conductivity values are seen during baseflow conditions and lowest during peak spring snowmelt (baseflow consists of a higher proportion of groundwater, which has higher conductivity). Turbidity hysteresis curves have been plotted to determine sediment source areas. A clockwise pattern is the dominant signature in all watersheds, especially in the fall and winter (i.e., the



turbidity peak occurs prior to the discharge peak), indicating localized instream sediment sources such as bank erosion. Fewer winter storm events produce a strong turbidity signal when compared to fall season storms (but fall storms are generally not large flow events). The working conceptual model is that sediment accumulates at the toe of banks during low flow periods and then is transported during high flows.

Discharge measurement initially presented challenges for the SNAMP Water Team researchers. Problems resulted from the orders of magnitude differences between base flow and peak flows, subsurface flow, and potential changes in natural channel cross-sections. A two part approach has been used for flow measurement: (1) use of a seasonal V-notch weir bolted onto existing culverts for low flows, and (2) use of ultrasonic depth sensors for high flows. Culverts must be closed bottom, have well compacted fill, have solar power available, and have suitable drop for a weir. The main benefits are low cost, minimal maintenance, no rating curve needed, and minimal permitting requirements. Both depth sensor and v-notch flow measurements match well with independent discharge readings.

The RHESSys (Regional Hydro-Ecologic Simulation System) model is being used for water balance and energy balance modeling. Kings River Experimental Watershed (KREW) study data have been used to parameterize the model, since it has a longer data set than SNAMP. Model runs for streamflow match measured data much better when the model is informed if precipitation occurred as rain or snow. Cumulative streamflow with the model and observed data are very similar. Soil moisture storage modeling has been more problematic. Next steps for modeling include: refining the parameters to optimize fit, running the model under various thinning and climate scenarios to see how water yields respond, and integrating results with other SNAMP team findings.

SNAMP water data is publically available. Meteorological station real-time data is posted on the DWR's California Data Exchange Center (CDEC) site: <http://cdec.water.ca.gov/>. All other Water Team data is available at the SNAMP digital library: <https://snamp.ucmerced.edu/> (not real-time data). A detailed progress report produced for DWR by the SNAMP Water Team in 2012 is available at: <http://snamp.cnr.berkeley.edu/documents/470/>. Questions on the project can be sent to Ms. Martin at: [smartin@ucmerced.edu](mailto:smartin@ucmerced.edu).

### **Effectiveness Monitoring Committee Update**

George Gentry announced that the formation of the Board's new Effectiveness Monitoring Committee (EMC) is actively being worked on by Board and CAL FIRE staff. This concept was discussed by the MSG several times in 2008 and 2009, but put on hold until the completion of the VTAC work. Development of the EMC is occurring to determine if recently adopted Forest Practice Rules are effective in protecting beneficial uses such as salmonid habitat, or if further modification is required. With the EMC, we can build a water quality-related effectiveness monitoring program that can provide an active feedback loop to policy makers. The goal is to use scientific findings consistently for rule making by applying an adaptive management approach. The MSG itself will continue to function, largely serving as an information sharing venue, as it has for the past twelve years.

A draft EMC Charter for a structured (appointed) group has been produced and is currently under review by Board and CAL FIRE staff. Funding for this endeavor is still unclear, but it is hoped that AB 1492 funding will be available, since it calls for "monitoring the effectiveness of the laws and regulations in promoting ecological benefits." On-the-ground monitoring by interagency teams (with oversight and guidance by the EMC) is envisioned, as was successfully utilized by both the IMMP pilot effort and the Battle Creek Task Force. **When a draft EMC Charter has been finalized, it will be sent to Dr. Rick Standiford, Chair of the Board's Research and Science Committee (RSC), which will oversee the EMC. Following RSC and Board approval, the Charter will be fully vetted at a future MSG meeting.** Tim Feller asked if it would be possible to incorporate SWRCB concerns into this monitoring effort and Peter Ribar suggested using an adaptive management structure similar to that which has been successfully utilized in Washington.

## **Update on FORPRIEM (Forest Practice Rule Implementation and Effectiveness Monitoring)**

Clay Brandow, CAL FIRE, provided the MSG with an update on FORPRIEM. The goal of FORPRIEM is to obtain a complete 10% random sample of all THPs that have undergone a Work Completion Inspection from July 1, 2008 to the present. Trained CAL FIRE Forest Practice Inspectors conduct the monitoring work, collecting data on a randomly located 660 ft road segment, a randomly located 200 ft WLPZ segment, and two randomly located watercourse crossings within the randomly selected THP. To date, FORPRIEM data have been collected on 92 THPs and 20 NTMP-NTOs (NTMP data were collected in 2011 in the North Coast Hydrologic Basin). **Mr. Brandow stated that he is in the process of entering data into the FORPRIEM database and analyzing the data, with a report to be produced in 2013. He will continue to work with CAL FIRE Regional Resource Managers, Unit Foresters, and Forest Practice Inspectors to close the backlog of missing THPs that were randomly picked.**

Data collection procedures are very similar to those used in the earlier Modified Completion Report (MCR) monitoring program, and preliminary conclusions are that the results will be similar to those reported for the MCR work in 2006. Analysis of the FORPRIEM NTMP-NTO data is complete and results have been presented to the NCRWQCB and the Board of Forestry and Fire Protection. Based on the limited sample, NTMP-NTO WLPZ total canopy, and road and crossing rule implementation and effectiveness appear comparable to THPs. NTMP-NTOs generally were not found to have significant logging-related erosion problems; the majority of problems recorded were non-timber related (e.g., cattle trampling, hunting access, etc.). Inactive plans or plans without NTOs had a greater number of water quality-related problems. Mr. Brandow produced a detailed FORPRIEM update summary that is available (email Clay at: [clay.brandow@fire.ca.gov](mailto:clay.brandow@fire.ca.gov)).

## **Brief Update on Section V Technical Advisory Committee (VTAC) Activities**

Pete Cafferata provided a brief PowerPoint update on Anadromous Salmonid Protection (ASP) Rule Section V Technical Advisory Committee (VTAC) activities. Background information on Section V was provided, as well as a description of the five main types of potential riparian proposals that can be submitted for review (i.e., placement of large wood, thinning conifers for increased growth, thinning for fuel hazard reduction, modifying riparian stand composition, and sediment reduction). **The draft VTAC guidance document is nearly complete and will be finished by the end of 2012. A presentation to the Board by VTAC Chair Mike Liquori is anticipated at the February Board meeting. Training for RPFs and agency personnel will occur next year.**

The VTAC will stay together informally through the pilot project process. It will continue to have input and provide guidance on the pilots in 2013. **One or two VTAC agency representatives will document lessons learned from the pilots for possible modification to the VTAC guidance document. Information from pre-consultations, etc. will be disseminated by email and conference calls.** One pilot project is under development with Green Diamond Resource Company in Humboldt County and additional potential projects are being considered by other landowners, including Collins Pine Company, Campbell Timberland Management, LaTour Demonstration State Forest, and Jackson Demonstration State Forest.

## **New and Unfinished Business**

Nick Kunz announced that the SWRCB will be holding bioassessment training workshops in several locations and times in 2013. Courses include: Concept of Bioassessment and Program Implementation, SWAMP Bioassessment Field Procedures, Aquatic Invertebrate Laboratory Procedures and Biological Metrics, and Bioassessment Data Analysis and Interpretation. For more details and registration, see: <http://www.swrcb.ca.gov/academy/home.htm>. The sessions are open but on a space available basis; SWRCB staff have priority.

### **Next Monitoring Study Group Meeting Date**

**The next MSG meeting date is tentatively planned for March 20, 2013, with the location to be determined.** When a definite date, venue, and agenda are available, this information will be emailed to the MSG contact list.